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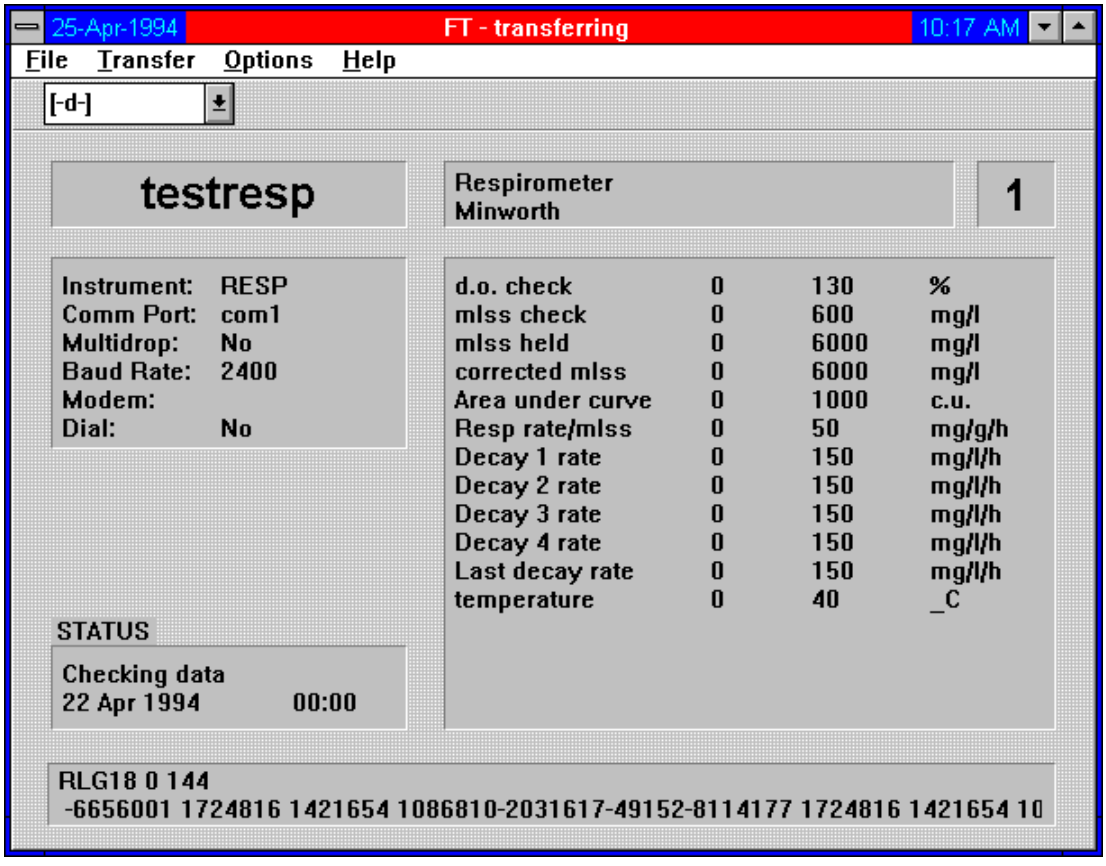

USER'S MANUAL

MSL '*FT For Windows*'

Release 2.0 – September 2000

These instructions describe the installation, operation and maintenance of the subject equipment. Failure to strictly follow these instructions can lead to an equipment rupture that may cause significant property damage, severe personal injury and even death. If you do not understand these instructions, please call Severn Trent Water Purification for clarification before commencing any work at 215-997-4000 and ask for a Field Service Manager. Severn Trent Water Purification, Inc. reserves the rights to make engineering refinements that may not be described herein. It is the responsibility of the installer to contact Severn Trent Water Purification, Inc. for information that cannot be answered specifically by these instructions.
Any customer request to alter or reduce the design safeguards incorporated into Severn Trent Water Purification equipment is conditioned on the customer absolving Severn Trent Water Purification from any consequences of such a decision.
Severn Trent Water Purification has developed the recommended installation, operating and maintenance procedures with careful attention to safety. In addition to instruction/operating manuals, all instructions given on labels or attached tags should be followed. Regardless of these efforts, it is not possible to eliminate all hazards from the equipment or foresee every possible hazard that may occur. It is the responsibility of the installer to ensure that the recommended installation instructions are followed. It is the responsibility of the user to ensure that the recommended operating and maintenance instructions are followed. Severn Trent Water Purification, Inc. cannot be responsible deviations from the recommended instructions that may result in a hazardous or unsafe condition.
Severn Trent Water Purification, Inc. cannot be responsible for the overall system design of which our equipment may be an integral part of or any unauthorized modifications to the equipment made by any party other that Severn Trent Water Purification, Inc.
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MSL File Transfer program for Microsoft ® Windows v3.1, Windows '95 and Windows '98

About the 'FT For Windows' program

The MSL '*FT for Windows*' program has been designed as a simple to use communications program to allow the user of an IBM ® compatible personal computer (PC) running Microsoft ® Windows version 3.1 or later to retrieve stored data from Minworth Systems Ltd Intelligent Instruments via the PC's serial communications port.

While remaining simple to use, '*FT For Windows*' is extremely flexible in the way it can be configured. '*FT for Windows*' will work either via a direct communications link or via a modem. In the case of a site that requires a modem, 'FT For Windows' automatically handles all the dialling and modem protocol. All this is transparent to the user, who simply selects the sites from which he or she wants to fetch data.

With a simple text editor, the more experienced user can configure communication details for each site, and can add and delete sites from the menu and configure which instruments are to be accessed at each site.

'*FT For Windows*' is 'intelligent' in that it only fetches the data needed to bring the information stored on disk up-to-date with that stored on the instrument, so keeping transfer times and phone call costs down.

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BASIC INSTALLATION

You will have been provided with a 3.5" floppy disk or a CDROM containing all the files needed to install '*FT For windows*' onto your hard disk via the Program Manager in Microsoft Windows ® 3.x or Explorer in Windows '95 or Windows '98.

Earlier versions of the program were protected against unauthorised use by a software key or 'dongle'. This dongle is not necessary in versions of FT supplied after October 1999 and you can ignore the following paragraph.

If you are using an earlier version of FT, then to install the dongle, make sure your PC is turned OFF, saving any work first if necessary; Disconnect any devices or cables from the Parallel (Centronics) printer port (LPT1); plug in the dongle - it will only plug in one way - then plug any cables or devices that were originally plugged into the printer port into the back of the dongle. ***You should not plug in or remove the dongle while the PC is switched on****. When the dongle has been installed, power up the PC in the normal way. If there is a printer connected, it must be switched on for the 'dongle' to be recognised correctly.*

Observe the following steps to get '*FT For Windows*' up and running.

1. Insert the supplied floppy disk into the appropriate floppy disk drive of your PC.

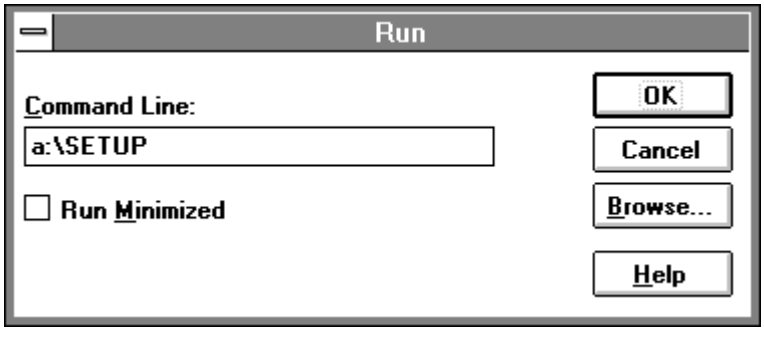
2. **Make one backup copy of the original disk.** Put the original disk away in a safe place and follow the subsequent instructions using this backup copy of the supplied disk. If you do not know how to copy a disk, look up the 'DISKCOPY' command in your DOS System Manual, or the Microsoft ® Windows File Manager 'Disk - Copy Disk' menu if you are running Windows.

3. Start up Microsoft ® Windows in the normal way if it is not already running.

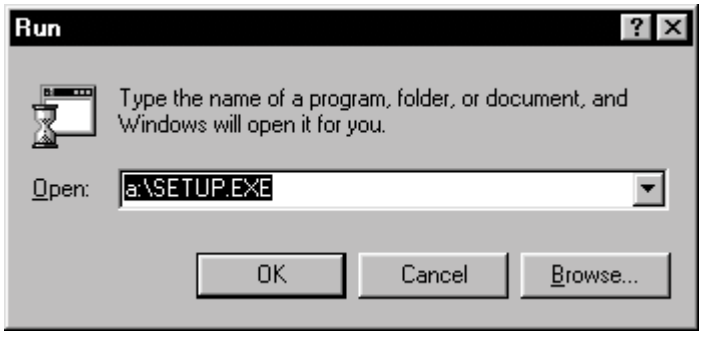
4. If using Windows 3.x maximise 'Program Manager', and click the 'File' menu item. If using Windows 95 or 98, click the start button in the task bar

5. In the File drop-down menu of Windows 3.x or the Start button sub-menu of Windows 95 or 98, click 'Run'

6. In the form that now appears, enter the path to the disk drive drive containing your backup installation disk and the program to be run - which is called '**setup**'. In Windows 3.x the form should look like the one below.



In Windows 95/98 the form will be something like that below. Whether using Windows 3.x or 9x the procedure is broadly similar



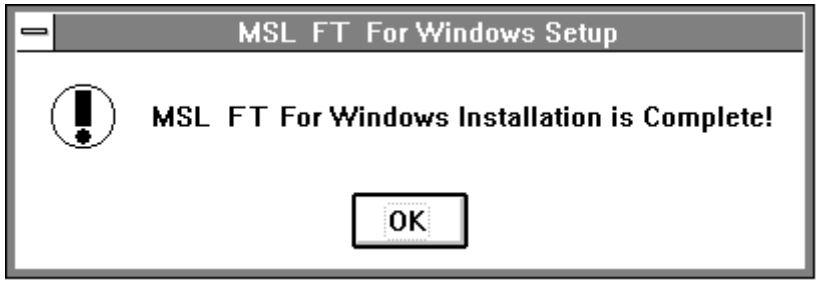
If the floppy disk drive containing the backup installation disk is drive b: the command line should be changed to read 'b:\setup'. When you have entered this information click the 'OK' button.

After a short delay, a box will appear in the middle of the screen saying 'Initialising setup'. The cursor will change to an hourglass shape, and there will be a delay of about 20 seconds while some of the files from the installation disk are decompressed and transferred to the hard disk.

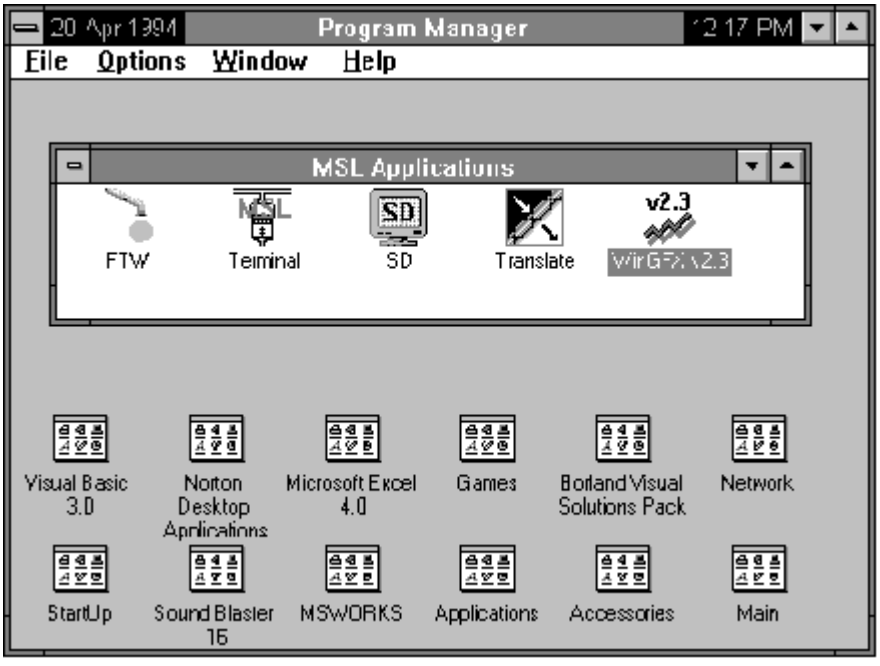
7. A form like the one below will now appear. It suggests that the directory where the '*FT For Windows*' program files should be placed will be named 'MSL' on hard disk drive C:. Edit this text if you wish the files to be placed in a different directory or on a different hard disk. However, we recommend you accept the suggested directory.

FT For Windows Setup
If you want to install FT For Windows in a different directory and/or drive, type the name of the directory.
Install To:
C:\MSL
To quit Setup, choose the Exit button.
Continue
Exit Setup

8. The set-up program will now decompress and copy the necessary files from your backup installation disk to your hard disk. Partway through a message box will appear telling you that the program is shelling to DOS so that it can copy some of the configuration files. Click the OK button in this box. The installation will then continue automatically. When it has finished, a box like that overleaf will be displayed. Click the 'OK' button to clear this box. Note that the program uses the DOS 'XCOPY' command. If this file is not on you hard disk, or the DOS PATH is not set to include the directory in which the XCOPY file is located, the installation will be incomplete. If this occurs, contact MSL for instructions on how to proceed with the installation by manually copying the missing files from the floppy disk.



Installation should now be complete. If a folder called 'MSL Applications' was not already on your system, a new folder with that title will have been added to Program Manager. In this folder will be a new icon labelled something like 'MSL FTW V1.13b'. If the folder already existed, the new icon will have been added to any existing icons in the folder. Your screen will look something like that below. To run '*FT For Windows*' you simply double-click this new icon - **but do not do this just yet**.



Note that the installation process places a number of files on your hard disk. If files with the same names are *already* on the disk in the appropriate directory, they will not be replaced UNLESS the new files have a later Time/Date stamp or Microsoft version number code than those files already on your disk. However, if files already on the disk have been made read-only for some reason, the set-up program will be unable to install the newer files, and the installation will be incomplete. If the installation is incomplete for any reason, a message box will appear warning you of that fact.

If your hard disk already has an 'ft.det' file (explained later in the manual), this will NOT be replaced, even if it is older than the one on the installation disk. This is done so you do not lose any settings you might have already made.

Should you have any problem with the installation of the software or installation of the software please contact MSL for advice.

Please now refer to the main manual that follows for how to use 'FT For Windows'.

Upgrading from 'FT For DOS' to 'FT For Windows'

PLEASE READ THIS IN THE UNLIKELY EVENT YOU ARE UPGRADING FROM "FT DOS"

IMPORTANT CHANGES IN PROGRAM OPERATION

The introduction of MSL's Microsoft Windows ® Version of the file transfer program (FT) means that the core suite of 16-Bit MSL programs MSL - '**FT**', '**GFX**', '**SD**', '**Terminal**' and '**Translate**'- now all have a similar look and feel, and all operate under Windows v3.1 or later.

If you have already bought '*FT for DOS*', this note will be included with your free upgrade to Version 1.0 of '*FT for Windows*'. All purchasers of '*FT for DOS*' have been supplied with free upgrades to version 1.0 of '*FT For Windows*'. If you are not upgrading from '*FT for DOS*', you can ignore this section of the manual. MSL are no longer promoting '*FT for DOS*'.

There are certain changes in the Windows version of 'FT' compared with the DOS version. These make it necessary for you to make some changes to your hard disk if you already have data stored there by the 'old' DOS version of 'FT'. To make the changes, you need to be familiar with Windows' "File manager". Please read the Windows manual if you are not familiar with the operation of 'File Manager'.

The directory structure in which files are stored

There are 2 basic types of data file that may be transferred from an instrument or data logger to your disk by 'FT' (whether the Windows or the DOS version) - A **Detailed** data file and a 15-Minute average **Daily** data file. (A third type, OUR, is specific to MSL respirometers.)

For Detailed data files, the directory structure where data is stored is unchanged from FT DOS. However, with 'FT for Windows' the name of the subdirectory under which the Daily average files are stored has been changed to a more meaningful name...

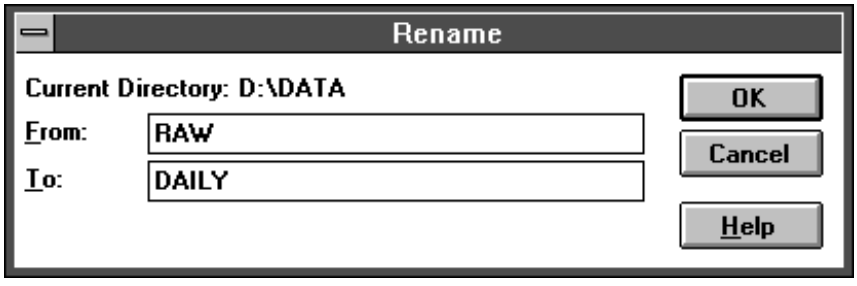
These are the Windows (new) and DOS (old) directory naming conventions for daily data files ...

FT Windows version	FT Dos version
\DATA\DAILY\site\year\Month\...	\DATA\RAW\site\year\Month\...

In other words, daily data will be stored under \DATA**DAILY**\... rather than \DATA**RAW**\....

We suggest that when you upgrade to '*FT For Windows*', you rename the existing \DATA\RAW directory to \DATA\DAILY. You can do this within Windows by opening 'File Manager', selecting the correct drive, then highlighting the \DATA\RAW directory in the directory tree and then clicking the **Rename** sub-menu from the **File** main Menu. If you do this correctly, in the rename From: box you should see 'RAW'. Into the To: box, enter 'DAILY' (without quotes).

The dialogue box should look something like this if you have done everything OK...



... If so, just click the OK button.

If you do not rename the Daily file directory in this way, the new Windows 'FT' will be storing its data in a different place to the old DOS FT, and 'GFX For Windows' will not be able to build up days of continuous data overlapping from the time you were using the DOS FT to the time you started using the new Windows FT. **You are STRONGLY urged to rename the daily files' directory as explained above.**

The configuration file FT.DET and the Routes files

The **'FT.DET'** File

Like the DOS version, the Windows version of 'FT' relies on configuration files. The main configuration file is 'FT.DET' which is probably in the directory \MSL on your hard disk. If this is so, provided you ran the '*FT For Windows*' set-up program according to the supplied manual and allowed it to install itself into the subdirectory \MSL , you need do nothing with the FT.DET file. If, however, you install the program to a directory other than \MSL, you should copy your old DOS FT.DET file into the directory into which you install the new '*FT For Windows*' program. You can use Windows' File Manager to copy the FT.DET file from another location if necessary.

'*FT*' expects to find your 'FT.DET' file in the same directory as the 'FT' program.

By default, the set-up program will install the '*FT For Windows*' program and an example 'FT.DET' file in the \MSL directory. You are strongly urged not to install '*FT For Windows*' to a different directory - allow it to install to \MSL. If you have been using DOS FT, there will already be an FT.DET file from the DOS FT installation in the directory into which you installed the DOS FT. In that case you should copy that existing FT.DET file, allowing it to replace the new (demo) FT.DET file that the '*FT For Windows*' set-up program places on your disk.

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The Routes Files

Like DOS FT, '*FT For Windows*' requires that each site's entry in the FT.DET file has a corresponding route file.

DOS 'FT' will have Routes files in the directory '**\ENVIRON\ROUTES.JB**', with names which corresponds to the #SITE entry in 'FT.DET'. '*FT For windows*' expects these files to be stored in **\MSL\ROUTES**. Providing you let the set-up program install '*FT For Windows*' in the suggested \MSL directory, a directory called \MSL\ROUTES will be created for you automatically, and a few demonstration Routes files will be placed in this directory. If you decided to install '*FT For Windows*' to a directory other than \MSL, you must manually create a \MSL\ROUTES directory (you can use File Manager to do this).

'*FT For Windows*' requires Routes files to reside in '\MSL\ROUTES'. Users of DOS FT must copy all their Routes files from \ENVIRON\ROUTES.JB into MSL\ROUTES.

'FT For Windows' requires Routes files to have the file extension .RT . This was not the case for DOS FT. This means that once you have copied the existing Routes files into \MSL\ROUTES, you must rename them all to have a **.RT** extension. For example, if the routes file was 'RESPIROM', you must rename it to RESPIROM.RT. You will need to do this for all the Routes files you have copied into \MSL\ROUTES. You should not alter the #SITE entry in FT.DET. In other words, if FT.DET had the line #RESPIROM, leave it alone. FT DOS would have a Route file called RESPIROM. '*FT For Windows*' wants this file to be called RESPIROM.RT and it must reside in \MSL\ROUTES.

You can, if you wish, create a new FT.DET file and corresponding routes files from scratch by following the instructions in the 'FT For Windows' user's manual. However this can be a complex procedure to avoid errors you may be best to re-use existing files as outlined above.

Summary For Upgraders...

To make the upgrade as simple as possible follow these steps.

1. **Install 'FT For Windows' onto your hard disk as described in the User's Manual, allowing it to be installed into \MSL as suggested.**

2. **Copy your old (DOS FT) FT.DET file into \ MSL**

3. **Copy all your Routes files from \ENVIRON\ROUTES.JB into \MSL\ROUTES**

4. **Rename each Route file to have the extension .RT - e.g. rename from *sitename* to *sitename*.RT**

5. **Start using 'FT For Windows' in place of the old "FT For DOS".**

6. **If you are quite happy that you know what you are doing, and would rather use the new program exclusively, you can then delete the old DOS version of FT, and its FT.DET and Routes files - but make sure it is the OLD version of FT and its files you are deleting!!**

Configuring MSL '*FT For Windows*'

Normally FT '*For Windows*' will be installed and configured for you by Minworth Systems, if you have arranged for MSL to install an instrument/logger and have bought '*FT For Windows*' / '*GFX For Windows*' at the same time.. However, if MSL have not installed the program for you, or you purchased the software at some later date, the following information allows users to configure the program for themselves.

'*FT For Windows*' requires certain configuration files to know which instruments to communicate with, how to communicate with them, and what type of data to retrieve. These files have to be named in a special way and kept in specific directories where the program, and other MSL programs expect to find them.

The configuration files.

Simple ASCII text files control the complete configuration of 'FT For Windows'. You can change the configuration of '*FT For Windows*' by editing these files using any standard ASCII text editor, such as DOS's 'Edit' program, or Windows' 'Notepad' program. You should not use a word processor to edit these files, unless it allows you to save files as plain ASCII text, because it may insert non-ASCII characters into the saved file.

The main configuration file is named **FT.DET**. There is only one FT.DET file, and it must be kept in the directory **\MSL** of the drive onto which you installed '*FT For Windows*'.

The other type of configuration file is the **Route File**. There must be one Route File for each site named in the FT.DET file. These Route Files are all kept in the directory **\MSL\ROUTES**. The names of Routes Files always end in **.RT** (that is they have names of the form SITENAME.RT)

A detailed description of the requirements for the format and contents of each of these files follows.

The main configuration file, FT.DET

This is the Details File for 'FT For Windows'. It contains details of every site from which data *can* be retrieved. For each site, the file specifies from which instrument(s) at that site data is to be retrieved and whether 15 minute average data and/or Detailed data and/or OUR data is to be fetched. **Every site which has an entry in here will automatically appear in the site selector menu when you run 'FT For Windows'.** A typical FT.DET file follows as an example.

```
#SITE       min_resp
#ROUTE      respirom
#STORE      min_resp
#GET        2
#OUR        2
#GETDT      2
#end        *

#SITE       wpark
#GET        1
#GET        2
#end        *

#SITE       sanfran
#GET        1
#GETDT      1
#end        *

#SITE       test_rig
#ALL        3
#ALLDT      3
#end        *
```

In this example, the sites included are min_resp, wpark, sanfran and test_rig. The various keywords that can be in the FT.DET file are now explained ...

#SITE

The keyword **#SITE** is used by 'FT' to control the list of entries presented when the user selects the 'File' - 'Select site' sub-menu in the FT program. This is not necessarily the same #SITE as in the corresponding route file. The #SITE keyword here tells '*FT For Windows*' the name of the site to be substituted for 'SITE NAME' in the directory path where the fetched data will be automatically stored. The text entered against #SITE is restricted by DOS's directory naming convention, because this will be used as the name of a subdirectory. Although a directory name can be (8 characters **.** 3 characters), you should **restrict the #SITE entry to 8 characters or less**. Also, the site entry cannot contain spaces, '\' or any other character not allowed in a DOS directory name.

'*FT For Windows*' uses the name provided with #SITE to automatically create the directory tree and filenames expected by the data viewing and manipulation package '*GFX For Windows*'.

'*GFX For Windows*' assumes that your data files will be resident in a Directory/Subdirectory system configured as follows...

DRIVE NAME - By default the drive the software is installed on
|
DATA - ALWAYS named 'DATA'
|
DATA TYPE - DAILY, DETAILED, MGMT etc.
|
SITE NAME - 8 Characters or less - e.g. TESTRESP
|
YEAR - As YYYY - e.g. 1993
|
MONTH - First 3 characters - e.g. JAN, FEB, MAR...
|
DATA FILES - Named as explained later

For example a pinfo file might be named...

C:\DATA\DAILY\TESTRESP\2000\SEP\01092000.P1

#GET

The keyword #GET instructs '*FT For Windows*' to retrieve 15 minute average data from the specified instrument. It is normally qualified by a single number: For example:

#GET 3 means "Fetch 15 minute average data from instrument number 3".

So in the example FT.DET details file on page 9, '*FT For Windows*' is being told to retrieve 15 minute average data from instrument number 2 at the site 'min_resp' ; from instrument numbers 1 and 2 at the site 'wpark' ; and from instrument number 1 at the site 'sanfran'. (Also the #ALL and #ALLDT instructs that all daily and detailed data is fetched from the site 'test_rig')

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Special case of #GET keyword

A single number, that being the address of a logger or instrument from which to fetch data, normally follows #GET. However for special circumstances, **'*FT For Windows*'** supports a case where the #GET keyword can be followed by three numbers rather than one. This feature was originally introduced for sites that have a large (more than 9) number of instruments/loggers connected together in a single loop or pseudo single loop.

'*GFX For Windows*' can accommodate up to 99 instruments/loggers at a single site. However, the Unix version of GFX is restricted to 9 instruments/loggers per individual site name. When the #GET keyword is followed by 3 parameters rather than 1, these parameters are used to create pseudo sites for retrieved data on disk - they have the following meaning:

First parameter:	The real instrument address on the loop or pseudo-loop.
Second parameter:	The sub-logger number. Currently not in use, this should be set to 1.
Third parameter:	The logger number data is to be stored as for 'GFX' programs.

As an example, imagine we have a single site with 12 instruments in a loop, and that there are 4 instruments on each on each of 3 units, Bio-Units 1, 2 and 3. Our \MSL\FT.DET file might include the following entries:

```
....
#SITE          BIOUNIT1
#ROUTE         RING1
#GET           1 1 1
#GET           2 1 2
#GET           3 1 3
#GET           4 1 4

#SITE          BIOUNIT2
#ROUTE         RING1
#GET           5 1 1
#GET           6 1 2
#GET           7 1 3
#GET           8 1 4

#SITE          BIOUNIT1
#ROUTE         RING1
#GET           9 1 1
#GET           10 1 2
#GET           11 1 3
#GET           12 1 4
....
```

In this example we would also need to have a single route file, called \MSL\ROUTES\RING1.RT, which would be used for all three sets of entries in FT.DET.

Data fetched from these original 12 instruments/loggers would be automatically placed in directories:

```
\DATA\TYPE\BIOUNIT1\YEAR\MONTH\DATAFILES   (original instruments 1 - 4, still 1 - 4)
\DATA\TYPE\BIOUNIT2\YEAR\MONTH\DATAFILES   (original instruments 5 - 8, now 1 - 4)
\DATA\TYPE\BIOUNIT3\YEAR\MONTH\DATAFILES   (original instruments 9 - 12, now 1 - 4)
```

#GETDT

The #GETDT keyword instructs '*FT For Windows*' to retrieve detailed data from the specified instrument. Like #GET, it is normally qualified by a single number. For example :

#**GETDT 3** means "Fetch detailed data from instrument 3".

So in the 'FT.DET' Details File example on page 8, '*FT For Windows*' will be retrieving detailed data from instrument number 2 at the site 'min_resp', and from instrument number 1 at the site 'wpark', but no detailed data would be fetched from the site 'sanfran'.

There is a corresponding special case to #GET where #GETDT can have 3 numbers rather than 1 number following it - see the notes above on #GET.

#ALL

The (qualified) keyword #ALL instructs '**FT For Windows**' to retrieve 15-minute average data from all instruments up to the number specified. For example:

#**ALL 3** means "Fetch 15 minute average data from instruments 1, 2, and 3".

So in the example Details File, '**FT For Windows**' will be retrieving 15 minute average data from instrument numbers 1, 2 and 3 at the site 'test_rig'.

#ALLDT

The keyword #ALLDT works in the same way as the keyword #ALL except that it refers to detailed data. For example

#**ALLDT 3** means "Fetch detailed data from instruments 1, 2, and 3".

So in the example Details File, '**FT For Windows**' will be detailed data from instrument numbers 1, 2 and 3 at the site 'test_rig'.

#OUR

The (qualified) keyword #OUR instructs '**FT For Windows**' to retrieve Oxygen Uptake Rate data from the specified instrument, which must be an MSL respirometer. For example

#**OUR 3** means "Fetch OUR data from instrument 3".

So in the Details File example on page 8, '*FT For Windows*' will be retrieving OUR data from instrument number 2 at the site min_resp. **Oxygen Uptake Rate data is available only from an MSL respirometer** and was only routinely used in early versions of this instrument. If this is specified for any other type of instrument this causes no problem - '*FT For Windows*' simply ignores the request.

#OURFSD

When MSL first started marketing respirometers, typical maximum OURs found on the plants on which they were installed were around 50 - 100 mg/L/h. As we branched out into other treatment processes, we found instances of much higher OURs (as much as 270 mg/L/h).

By default '*FT For Windows*' assumes OUR data will be in the range 0 -150 mg/L/h. If it exceeds 150mg/L/h, when you examine it with '*GFX For Windows*', it will have off-scale data, clipped at 150mg/L/h.

The keyword #OURFSD allows you to instruct '*FT For Windows*' to retrieve Oxygen Uptake Rate data from the specified instrument - which must be an MSL respirometer - and produce 'GFX For Windows' data files which will not be partly off-scale with high OURs. For example :

#OURFSD 300.0 means "Fetch OUR data, allowing a range from 0 - 300 mg/L/h

So in the Details File example on page 8, '*FT For Windows*' will be retrieving OUR data from instrument number 2 at the site min_resp, and assume (default) the OUR will not exceed 150 mg/L/h. If this were not the case, a #OURFSD entry would needed to be added.

Oxygen Uptake Rate data is available only from an MSL respirometer. If this is specified for any other instrument this causes no problem. '*FT For Windows*' simply ignores the request. Note - The Unix version of FT does not support fetching of OUR data.

#end

The #end * line **must** appear as the final line of the FT.DET file. Note it is lower case…

**#end *

APPENDIX A provides further examples of FT.DET file entries

The Route Files

Each site has its own Route File that is kept in the directory **\MSL\ROUTES.** This file contains details informing '*FT For Windows*' how to communicate with this particular site. The contents of such a file are illustrated with the example below:

The file name stem of the Route File is the same as the name of the site specified in the corresponding #SITE entry in FT.DET. The file extension is always ".RT".

The file for a site called Test_rig is shown here as an example. The route file specified in the FT.DET file name in this case was **\MSL\ROUTES\TEST_RIG.RT**

```
#SITE      Test_rig
#DEV       com1
#TYPE      DO
#MODEM     paxdata
#MOPT      V22B
#PH        0213131709
#SPEED     2400
#end       *
```

#SITE

The #SITE line entry is optional in a route file, and is used to specify a site name. To avoid confusion, we strongly recommend that this should normally be the same as the #SITE entry in \MSL\FT.DET. Example:

#SITE Test_rig

#DEV

The #DEV option must be given as either **com1** or **com2**, according to which of the PC's serial ports you want '*FT For Windows*' to use to access this site. These can be in either upper or lower case. COM3 and COM 4 are not supported. Example:

#DEV com1

#TYPE

The #TYPE option: The type specified by #TYPE must agree with the type of Minworth Systems instrument that '*FT For Windows*' will be talking to at this site. Otherwise no data will be retrieved. Possible options for #TYPE are:

DO (d.o. probe)
RESP (respirometer)
LOG (logger)
QM (quality monitor)
ADM (air demand monitor)
AM (ammonia monitor).

Where a site contains more than one instrument and the instruments are of different types, the #TYPE must agree with the type of instrument number 1.

#MODEM

The #MODEM option: This can be used to specify the type of modem being used where '*FT For Windows*' is required to dial a remote site. Possible modems are "hayes", "micom", "paxdata", "hp", "case", "dacom" or "exec". Nowadays nearly all modems are hayes compatible and the other types of modems are supported for historical reasons. For example:

#MODEM hayes

Alternatively, if the instrument is connected by a direct link, with no modem, the #MODEM option can be given as a number. In this case, '*FT For Windows*' will interpret the number as the baud rate at which to communicate with the instrument. For example:

#MODEM 1200

would cause '*FT For Windows*' to communicate at 1200 baud. ***This usage of #MODEM is not recommended because this function is now provided by the #SPEED option.***

#SPEED

The #SPEED option is used to specify the baud rate of the connection. For example:

#SPEED 9600

Would tell '*FT For Windows*' to communicate at 9600 baud, unless the #MODEM Option decreed differently.

If no #SPEED option is given, a default of 1200 baud is used, unless a #MODEM option is present in which case a default appropriate to the modem is used. See also #BAUD. You should not use both #SPEED and #BAUD. **#BAUD is preferred to #SPEED.**

#BAUD

The #BAUD option is used to specify the baud rate of the connection. If no #BAUD option is given, then a default of 1200 baud is used, unless a #MODEM option is present in which case a default appropriate to the modem is used. Supported values for #BAUD are:

75, 150 ,300 ,600 ,1200 ,2400 ,4800 ,9600 ,19200 ,38400

For example:

#BAUD 9600

would tell 'FT For Windows' to communicate at 9600 baud, unless the #MODEM option decreed otherwise. Note that the ability to use the higher baud rates depends on your PC system, and especially the quality of the UART in the serial port card. There is usually no point using very high baud rates, because MSL instruments normally communicate at 1200 - 9600 baud, depending on configuration and cabling quality.

#PARITY

The #PARITY option is used to specify the parity bit of data bytes of the connection. For example:

#PARITY EVEN

would decree that 'FT For Windows' should communicate at even parity.

If no #PARITY option is given, then a default of EVEN parity is used, unless a #MODEM option is present in which case a default appropriate to the modem is used. Acceptable values for #PARITY are:

EVEN, ODD or NONE (must be upper case)

#DBITS

The #DBITS option is used to specify the number of data bits in a communicated byte. For example:

#DBITS 7

would specify 7 data bits for the connection. If no #DBITS option is given, then a default of 7 bits is used, unless a #MODEM option is present in which case a default appropriate to the modem is used. Allowable values for #DBITS are 5, 6, 7 or 8.

#SBITS

The #SBITS option is used to specify the number of stop bits appended to a communicated byte. For example:

#SBITS 1

would specify 1 stop bits for the communications. If no #SBITS option is given, then a default of 1 stop bit is used, unless a #MODEM option is present in which case a default appropriate to the modem is used. Allowable values for #SBITS are 1 or 2.

#MOPT

The entries that can be put in the #MOPT option are specific to each supported modem. In the example on page 8 it is used to indicate to '*FT For Windows*' to use the specified modem in V22BIS mode. These options are modem-specific, and their positioning is modem-specific. Contact MSL if you need to incorporate modem-specific commands.

#PH

The #PH option specifies the telephone number and is only required where a modem is being used. For example:

#PH 01235512000 (This is Capital Controls-MSL's phone number - it is not a modem line!)

If no #PH option appears in the route file, '*FT For Windows*' will assume that the site is connected directly, regardless of whether the #MODEM and/or #MOPT options are present.

#end

A #end * line must appear as the final line of the file. Note the word 'end' is lower case. Example:

**#end *

SEVERN TRENT SERVICES
CAPITAL CONTROLS

'FT For Windows' Configuration - Adding a new site

To add a new site to the list of sites that '*FT For Windows*' can fetch you need to do two things. Both require only the ability to use a simple ASCII text editor.

1. Open and edit the FT.DET file to an entry for the site like the ones in the example on page 8.

2. Create a Route File for the site, like the one given for example for Test_rig on page 12. The Route File must go into the directory \MSL\ROUTES, and must have the file extension .RT, and the stem the same as the #SITE entry in FT.DET.

Note that the order in which the sites appear in the Site Selection box in FT is governed by the order in which they appear in the FT.DET file. They are not alphabetically sorted. Therefore it is convenient if you place the sites most recently accessed at the beginning of the FT.DET file.

'FT For Windows' Start-Up

This manual assumes you are familiar with the basic operations required to use whichever version of Microsoft ® Windows you are running. If you are not, you are recommended to run the appropriate Windows Tutorial and/or read the manual before proceeding.

To start FT For Windows

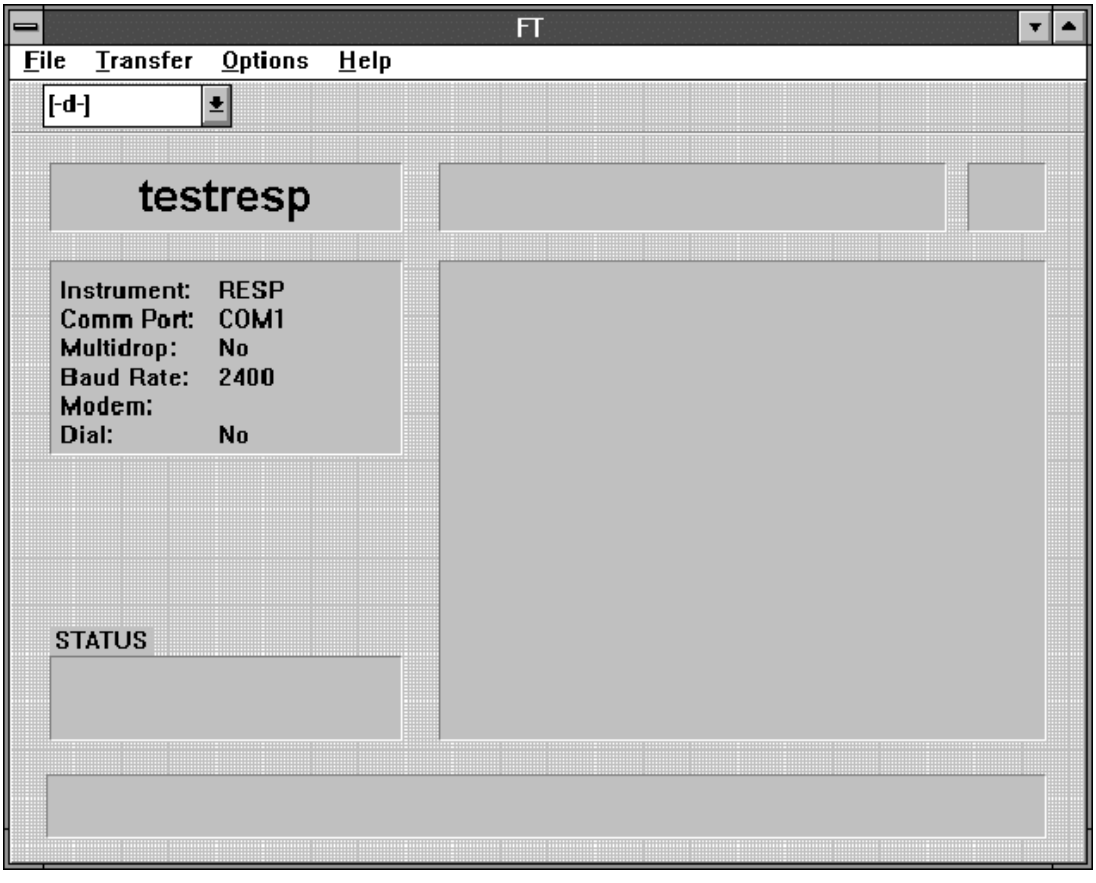
1. Start up **Windows** in the normal way.

2. Open **Program Manager**, **Explorer**, or your substitute **Windows shell program**, in the normal way

3. Open the folder containing the MSL applications - by default the install program will have created a folder called '**MSL Applications**'

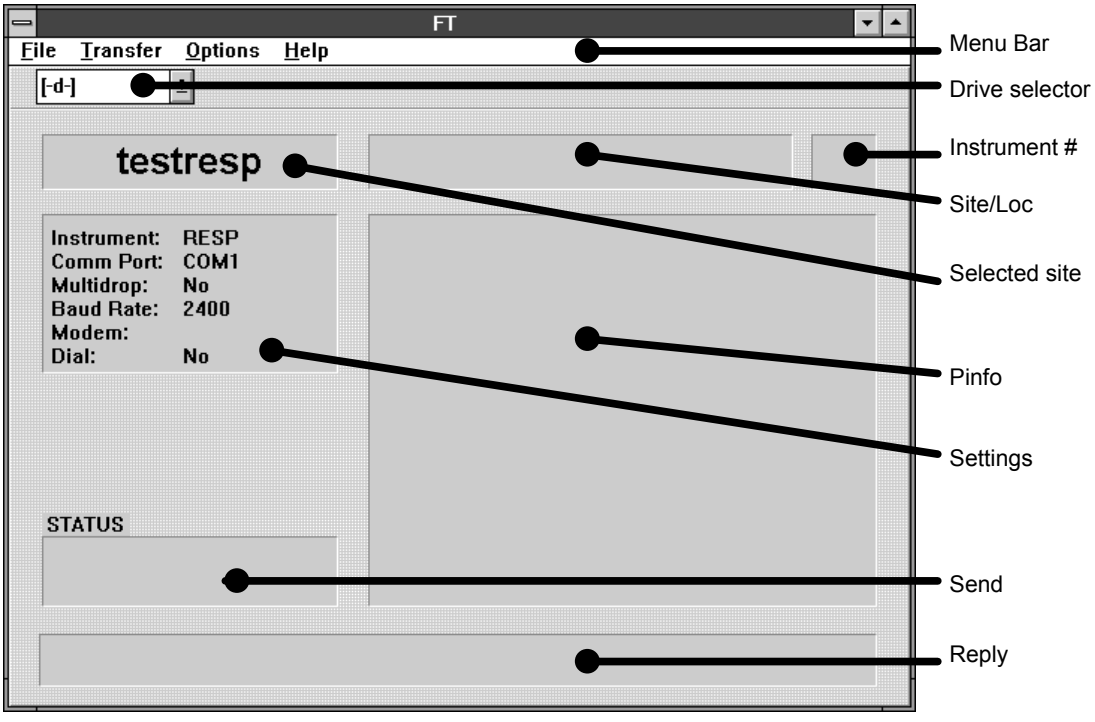
4. Double-click on the icon for the '***FT For Windows***' Program. The icon shows a blue-grey pole with a yellow or orange ball attached, representing a floating probe.

The program will now load and the Start-Up form will be displayed. It will look *something* like...



If you see a window like that below, it means the program required an MSL software protection key but none was detected. Early versions of MSL programs will not run without this key. If a dongle is plugged into the LPT1 printer port, and the printer is not switched on, switch the printer on and re-run '*FT For Windows*'. If no dongle is plugged in and the software version requires a dongle, close down Windows, saving any work if necessary; then power down the PC; plug in the dongle; power up the PC; run Windows then 'FT For Windows'. If the dongle is still not recognised, contact MSL.

Under normal circumstances, the Start-Up window will be displayed when you run '*FT For Windows*'. The major parts of the Start-Up window are labelled below and will now be described in turn:



The caption bar

Not labelled above, this is the standard Windows application caption bar, above the menu bar. In the centre is the caption (FT). On the left is the control button, and on the right are the maximise and iconise buttons. The caption bar is a standard feature of Windows and will not be described further, except to say that you should NOT close down '*FT For Windows*' from the caption bar control button. You should always use the **File** menu - **Exit** submenu, because otherwise the communications port will not be closed properly, and the errors log file will not be created.

The Menu bar

The menu bar contains the main menu items. Clicking on one of these produces a drop-down menu with further options you can select. (Clicking refers to the process of positioning the mouse cursor over an object and pressing and rapidly releasing the left mouse button; Double clicking refers to the process of positioning the mouse cursor over an object and pressing and rapidly releasing the left mouse button twice).

The Drive Selector Box

This shows the drive onto which your data files will be stored. By default it will show the drive from which '*FT For Windows*' was run. If this is not the drive on which the data files are to be stored, click the arrow at the right of the Drive selector box, then double-click on the drive letter on which you want files to be stored.

The Selected Site Box

When you start the program, if there is only one entry in the FT.DET file its site name will be displayed in the selected site box and the corresponding settings read from its Route (.RT) file will be displayed in the Settings box. If there is more than one entry in FT.DET, these boxes will only show a site and its settings once you have selected a site via the **File** - **Select Site...** drop-down menu.

The Site/Loc Box

Once the program has communicated with an instrument, the site and location read from the instrument will be displayed in this text box.

The Instrument # Box

Once the program is communicating with an instrument, the instrument number being addressed will be displayed in the instrument number box.

The Settings Box

When you start the program, if there is only one entry in the FT.DET file, its settings taken from the corresponding Routes (.RT) file will be displayed in the settings box and the corresponding site name will be displayed in the Selected Site box. If there is more than one entry in FT.DET, these boxes will only show a site and settings once you have selected a site via the **File - Select Site...** drop-down menu.

The Pinfo Box

When communications between the program and an instrument have proceeded far enough, the Pinfo (Parameter Information) data stored in the instrument will be displayed in the pinfo box. The Pinfo holds the names of the signals logged on an instrument, their engineering units and their scale range.

The Status - Send Box

The status – send box displays the status of the communications - while communications are in progress the queries being sent to the instrument are displayed in this window.

The Status - Reply box

The status – reply box displays the status of incoming communications - while communications are in progress the replies received to queries being sent to the instrument are displayed in this window. Some data is compressed on the instrument to maximise the amount it can store locally. Therefore the data read back will not always be simple textual data, and will not be readily interpreted visually. However the 'FT For Windows' program understands the format of the encrypted data and translates it to the format required by 'GFX For Windows'.

SEVERN TRENT SERVICES
CAPITAL CONTROLS

Step-by-step sequence for operating *FT For Windows*

You are recommended to follow this sequence to operate 'FT For Windows' successfully in its *basic* mode....

1. Before powering up the PC, ensure that the MSL software protection dongle is plugged in to the printer port LPT1:.if your version of software requires a key (Pre October 1999) Also ensure that if a printer is connected to the dongle that the printer is switched on.

2. If you have not already done so, ensure the **\MSL\FT.DET** file has the correct format and contains entries for all the sites from which you may wish to collect data.

3. Ensure there is a valid Route file (*sitename*.RT) for each site which has an entry in the FT.DET File. Ensure all these routes files reside in **\MSL\ROUTES.**

4. Ensure your communications link is physically connected. If you are using a direct link, ensure the cable is plugged in to the correct port on the PC and is connected to the instrument at the other end. If using a modem link, ensure the modem is plugged in to the correct port on the PC, is powered up, correctly configured, and is plugged in to the telephone line.

5. Start up Microsoft ® Windows then start '*FT For Windows*' (see p. 16).

6. If you want to store the data on a disk drive other than that from which the program was started, click the arrow to the right of the drive selector box, then double click on the drive you want to use.

7. Click the **File** entry on the menu bar.

8. Click the **Select Site** entry from the drop-down menu.

9. Click the site from which you wish to retrieve data from the list of sites displayed, then click the OK button.

10. Click the **Transfer** entry in the main menu bar. '*FT For Windows*' is now ready to proceed to fetch the required data from the required instruments on the selected site, using the settings specified in the FT.DET file and the site's ROUTE (.RT) file.

11. '*FT For Windows*' will now connect to the selected site and to the instrument(s) from which data is to be retrieved, and will check what data is stored on the instrument but is ***not*** stored on the selected disk drive. It will then proceed to fetch data from the instrument until the data stored on the disk corresponds to the data stored on the instrument. **'*FT For Windows*' is 'intelligent' in that it only fetches the data needed to bring the information stored on disk up-to-date with that stored on the instrument, so keeping transfer times and phone call costs down.**

12. Once data transfer is complete, either go back to step 6 if you want to fetch data from another site, or click the '**File**' menu item, then click '**Exit**' in the drop-down menu. The program will then close down. You could now run MSL '**GFX For Windows**' to examine the retrieved data.

Notes…

If there were any problems in the session, you could examine the messages in the errors file created by '*FT For Windows*' after closing down the program. The program creates a file named \MSL\FT**n**.TXT, where n is a number. If you ran up one instance of the program, as is normally the case, **n** is 1. This file is a simple ASCII text file and can be examined by a simple editor like Windows' NOTEPAD program.

Problems are nearly always caused by poor communications links - e.g. noisy telephone lines.

You can run up multiple instances of 'FT For Windows', up to a limit of 10 instances. However, since each instance would have to communicate through a different Comms Port, this is rarely of practical use since most PCs have only one, or at most 2 free serial communications ports.

If using a modem, always make absolutely sure that it is really off-line at the end of a session, or you could incur some very high 'phone bills!

File Menu

Clicking the File menu item produces a drop-down menu with 2 options: 'File-Select' and 'Exit'

File - Select Site Sub-menu

When you click the File - Select Site sub-menu a box like that below will be overlaid onto the Start-Up Form. The left of the box shows the sites, read from the FT.DET File. A vertical scroll bar will be present to the right of the list of sites if there are more sites than can fit in this window. Use this scroll bar to access sites not currently visible in the window. Single click the name of the site from which you wish to retrieve data, then click the 'OK' button. The site selector window will then disappear. The name of the site you selected will be shown in the main window's Selected Site box, and the communications settings will be shown in the Settings box. To proceed to fetch data, click the Transfer Option on the start-up form main menu bar.

File - Exit sub-menu

Clicking the Exit sub-menu item closes down 'FT For Windows', closes any open files, and closes down the communications port. Please use this method to ensure the program closes cleanly. Closing the program by any other means (control button, task switcher etc.) could result in loss of data.

N.B. If using a modem, always make absolutely sure that the modem is off line at the end of a session, or you could incur some very high 'phone bills!

'Transfer' Menu

The Transfer Menu provides access to 2 sub-menus - 'Start' and 'Abort'. To access these sub-menus, you will first need to select a site to fetch. Until you have selected a site, these sub-menus will be 'greyed-out' - that is, unavailable. Once you have selected a site, its name will be displayed in the Selected Site box on the main form, and its settings will be displayed in the Settings box.

'Start' sub-menu

Clicking the Start sub-menu starts the process of transferring data from the instruments on the selected site to the disk drive selected when you started '*FT For Windows*'. When you selected a site, the program will have looked at the appropriate Route file (*sitename*.RT) to find out from which instruments data are to be fetched, and what kind of data are to be fetched. It will also have looked at the FT.DET file to decide what communications settings are to be used (baud, parity, etc.) and what type of connection is to be made (direct, modem etc.)

The program will then attempt to establish a connection to the site/instrument. If a modem link is involved, the program will try to dial the site using the telephone number provided in the **#PH** entry in the Route file (see pp 9 - 10), initialising the modem according to the entries in the **#MODEM** and **#MOPT** fields. If a direct connection is specified, it uses the baud rate specified in the **#SPEED** entry of FT.DET.

Connection via modem

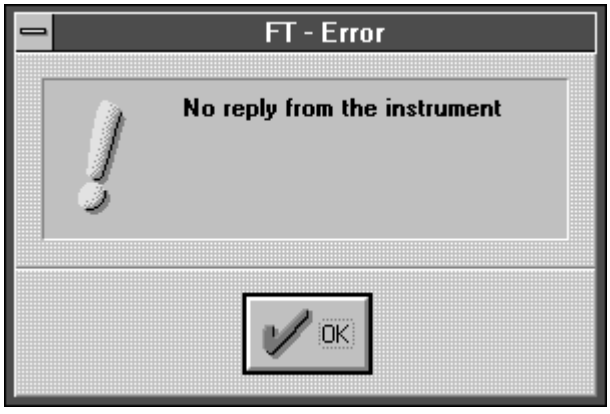
If the site access requires the use of a modem, you will see the text '**Contacting**' in the send status box and the text '**Dialling**' in the reply status box.

If the program cannot establish a connection, the following message will appear...

If this message box appears, it may simply mean the phone line is engaged, or is of bad quality, and you should close down 'FT For Windows' and try again later. If this is not the case, you should check the obvious things: Is the modem switched on?; Is it plugged in to the phone line?; Is the communications cable between the PC and the modem OK?; Is the modem set up correctly?

Direct Connection, or connection from modem to instrument at the site

If the Route file specifies a direct connection, or if a modem is being used and the connection has been established between the PC's modem and the site's modem, the program will now try to talk to the specified instrument(s). The Status Send box will contain something like '**Checking Type**', and the Status Reply box something like **'CFG'**. Numbers may precede these commands if there are a number of instruments multidropped on the site, and other commands may be sent before the 'CFG' command. If the program receives no reply, or a garbage reply from the requested instrument, you will see the following message box ...

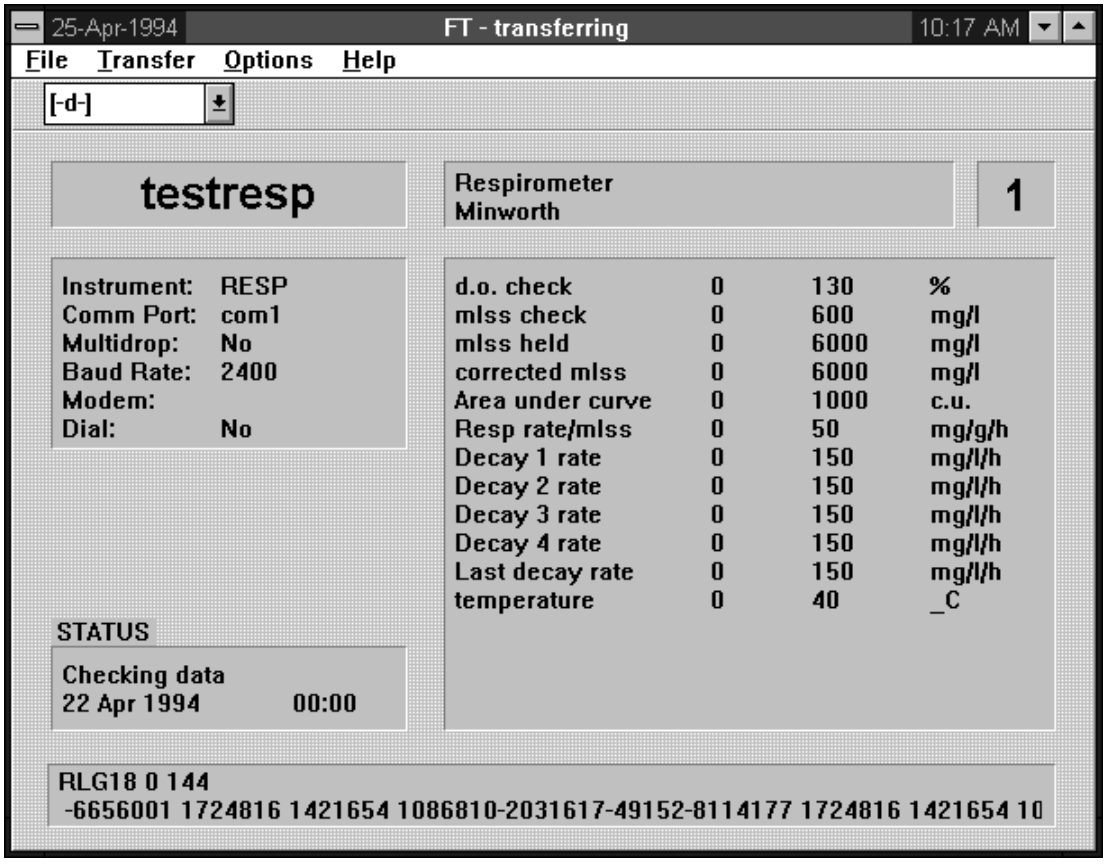


If you see this message, it means that the program cannot establish communications with the instrument(s). If this happens, check the obvious things first: If a direct connection, is the cable link intact?; Is the bade rate, parity etc. set correctly on the PC (via the FT.DET file) and on the instrument? ; Is the instrument switched on? If a modem link has been established, is the link from the remote modem to the instrument intact?; Is the baud rate correct?; Is the instrument switched on?

Assuming communications *has* been established OK, the program will now proceed as follows. As it proceeds, the commands sent to the instrument are shown in the Status Send box, and the replies received are shown in the Status Reply box.

The program interrogates each selected instrument in turn. It looks at what kinds of data requested via entries the FT.DET and *sitename*.RT files are present on the instrument(s) but not present on the selected disk drive. It will then proceed to fetch data until it has updated the selected disk drive with all the data required to bring its files up-to-date.

For each instrument from which it is to fetch data it will first send a configuration request, to find out how many signals are logged on that instrument. It then asks for some more bits of information, including things such as the date and time recorded on the logger, It will then proceed to fetch the 'Pinfo' information (**P**arameter **Info**rmation) from each instrument and display it in the Pinfo box in the main window. The Pinfo is an area of memory on each logger holding the name of the site, the name of the instrument, and for each signal logged the name of the signal, its engineering units and its scale range.



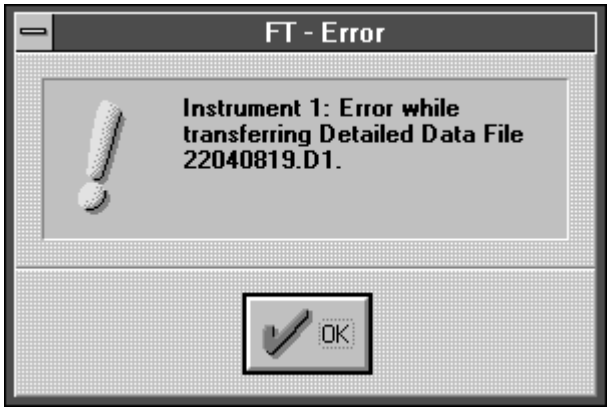
Once the Pinfo has been fetched, the screen will look something like that shown above. The program will now continue to fetch data until all the data requested that is present on the instrument has been fetched and written to the selected disk drive. During this time various information will be shown in the Status Send and Status Receive boxes.

When all the information has been fetched from an instrument, the program will either repeat the procedure for the next instrument on the site to be fetched, or will return you to the main menu where you can select another site from which to fetch data, or you can exit the program.

If there are any communications problems during the transfer - for example a reply received is garbage - the program will try the command twice more before giving up on the communications.

The program allows plenty of time for a reply to a request from the PC to be serviced by the instrument - the so-called '**Timeout**' period'. If no reply is received within this period, the program will abort the data transfer attempt. In this circumstance, you will see the message 'Timeout' in the Status Reply box. One reason for a 'Timeout' may be that the phone line drops, or becomes too noisy for reliable communications.

If for any reason the session does not complete successfully, for example because the communications link is lost part-way through, you may see a message like that below...



You may also get a second message box like...

Under these circumstances, click the OK button, exit the program (File - Exit), check the communications link, and try the program again. Look at the errors file \MSL\FT**n**.TXT , where '**n**' is a number corresponding to the instance of session of 'FT For Windows' being run. If only one instance is running, n will be 1. You will not be able to interpret *all* the information in the errors file, but will be able to decipher simple messages. In case of repeated problems and referral to MSL, you may be asked to read or Fax the contents of this file to help with troubleshooting.

Note that you cannot view the error log file until you exit 'FT For Windows' using the File-Exit sub-menu, because until you close the program, the file is open and locked for the exclusive use of '**FT For Windows**'.

Hopefully you will not see error message windows, you will see the following message...

Once all data has been fetched successfully, either select another site (File - Select Site Sub-Menu) or close the program down (File - Exit sub-menu). If the session has resulted in a timeout or a communications or other error, close the program (File - Exit sub-menu), and examine the FTn.TXT errors log file (for example using Windows 'Notepad' applet, or your preferred ASCII text editor/viewer) to try to determine the cause of the error.

If using a modem, always make absolutely sure that it is really off line at the end of a session, or you could incur some very high 'phone bills!

Once the data have been transferred to disk and the program has been properly closed down, you can then run '**GFX For Windows**' to examine and manipulate the retrieved data.

'Abort' sub-menu

The abort sub-menu is only enabled once a transfer is in progress. It allows you to abort the communications. In this case, data transfer will be incomplete, and a message will pop up informing you of the fact.

Options Menu

When you click the Options menu item a box like that below will pop up. This facility is provided for advanced users of the program, and is not necessary for normal, basic use.

Data to fetch
Instrument 1 Detailed Daily OUR
Instrument 2 Detailed Daily OUR
Instrument 3 Detailed Daily OUR
Instrument 4 Detailed Daily OUR
Instrument 5 Detailed Daily OUR
Instrument 6 Detailed Daily OUR
Instrument 7 Detailed Daily OUR
Instrument 8 Detailed Daily OUR
Instrument 9 Detailed Daily OUR
Instrument 10 Detailed Daily OUR
Instrument 11 Detailed Daily OUR
Instrument 12 Detailed Daily OUR
Instrument 13 Detailed Daily OUR
Instrument 14 Detailed Daily OUR
Instrument 15 Detailed Daily OUR
OK
Cancel

It shows a list of up to 15 instruments, with a small tick or a blank square box corresponding to the type of data that is to be read from each instrument. This information is initially taken from the 'FT.DET' file when a new site is selected, and there will be ticks in the fields of this form for whichever instruments were selected for data to be fetched from them. You can override these settings by clicking the appropriate boxes in the options form. For example, in the form above, if you were click the OUR tick, the tick will be turned off and the OUR data would NOT be fetched. However, if the data from instrument 1 had already been fetched, any changes to this form would be ignored for that instrument. If you tick the OUR option, and the corresponding instrument is not a respirometer, the program will ignore the request for OUR data.

About Menu

Clicking the about menu pops up a small window showing the version number of 'FT For Windows' and an MSL copyright message.

Automatic running of 'FT For Windows'

In Order to automate the running of 'FT For Windows, two things are required....

1. The ability of 'FT For Windows' to accept a command line parameter, specifying a site to fetch.

2. A program to automatically run a command-line version of 'FT For Windows' at times specified by the user - in other words, a PC version of the Unix 'cron' utility.

Command line parameter

'FT For Windows' version 1.12 onwards supports a command line parameter. The parameter that should be passed on the command line is a single string of text, being the name of a (single) site you want 'FT For Windows' to fetch. If you invoke 'FT For Windows like this, as soon as it starts it will try to connect to, and fetch data from the site you specified on the command line. This means that you do not have to go through the operation of selecting the site and telling 'FT For Windows' to start a transfer - it is all done automatically.

How to add a command line parameter

To add a command line parameter, you use Windows Program Manager. To illustrate this, assuming you accepted the default directories and folder when installing '*FT For Windows*':

1. Open the MSL Applications folder in Program manager.

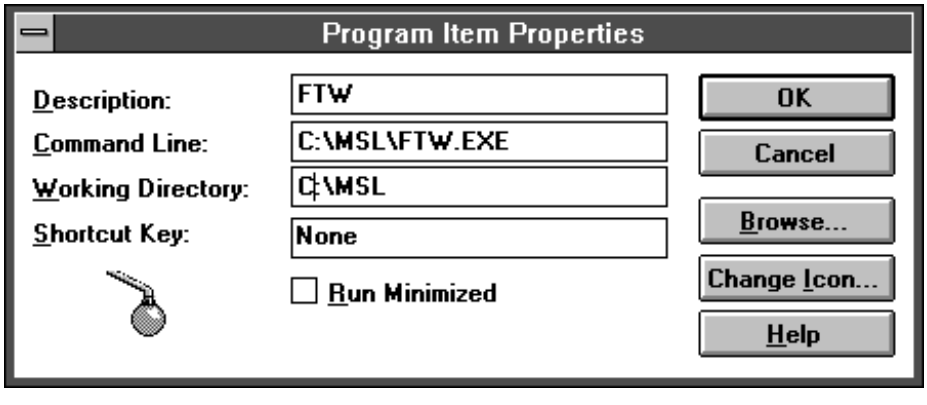
2. Click on the 'FT For Windows' icon (do not double click - this would launch the program).

3. Click on the Copy sub-menu in the Program Manager File menu.

4. In the dialogue box labelled 'Copy Program Item', click in the drop-down list of folders that appears and scroll down to the one labelled 'MSL Applications'. Click on this, then click the OK button.

5. When you look at the MSL Applications folder, you will now see **two** icons for 'FT For Windows'. Single click on one of them - its title text will become highlighted.

6 Click on the Program Manager File - Properties sub-menu. You will see a dialogue box like that below...



7 Edit the text in this dialogue box as follows..

Description : Change it to FTW *Sitename - e.g. FTW Test_rig*
Command Line : Change it to C:\MSL\FTW.EXE *Sitename*
- e.g. C:\FTW\FTW.EXE Test_ig
Working directory : Leave alone

Then click the OK Button.
Note that in the command line option, Sitename must be the name of a site specified in the FT.DET file, with a corresponding .RT Route file. There is a single space between ..FTW.EXE and Sitename.

The instructions above tell you how to create an icon for 'FT For Windows' such that when you click on it, it will automatically invoke 'FT For Windows', which will automatically select the specified site, go and fetch data from it, and then close itself down. If you want to automate this procedure so that this happens daily, every four hours, or whatever, you need a Windows program similar to the Unix 'cron' facility - see the next section.

'CRON' - Running programs automatically at user-specified times.

To automatically run a Windows Program (like 'FT For Windows') at user-specified times requires a utility program similar to the Unix 'cron' program. One such a program is available as Shareware as '**WCRON**' from Cinétique Systems in Canada.. MSL do not believe in 're-inventing the wheel', and since WCRON fits the bill nicely, there is no point our writing our own 'cron' program. Cron-type programs are available from various shareware vendors, web sites and bulletin boards. There are other such programs available, typically described as 'cron' or 'schedule' programs. A search of the web will doubtless unearth others.

If you obtain 'wcron', or a similar shareware program you must register it - not only because it is the moral and just thing to do, but because the unregistered version may well bring up a copyright notice randomly about one run in 10, which would result in the planned program not running, randomly, one time in 10! The registered version would have no no such restriction.

'Cron' type programs are not, of course limited to use with 'FT For Windows' - they can be used to run *any* windows program at user specified times, and can run different programs at different times, so allowing you for example to make 'FT For Windows' fetch data from a number of different sites by scheduling different command-line versions of 'FT For Windows' to run at differing times.

If users obtain 'wcron' or a similar program, MSL cannot undertake to provide them with technical support for the program. This must be sought from the program suppliers or authors themselves.

Appendix A, which now follows, gives further examples of the entries in FT.DET files

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SEVERN TRENT SERVICES
CAPITAL CONTROLS

APPENDIX A

Further examples of FT.DET file entries

Appendix A

EXAMPLES OF FT.DET FILE ENTRIES FOR MULTI-DROP & SLAVE INSTRUMENTS

EXAMPLE 1 – a double-headed DO instrument

This example is for a double D.O. + SS SLAVE at multidrop address 4

The SS slave does not independently produce separate detailed information. The two D.O. heads *do* but they are interlaced when retrieved by FT and are displayed alternately within GFX if you do not take special precautions, and when you examine the detailed areas it can be difficult to decide which head which detailed are belongs to.

Therefore the '**GETDT**' in FT.DET has a 'detail logging group' override facility….

This is calculated as:

32 + instrument address + ([head number –1] x 16)

In this way each head's detailed information can be given a unique GFX file address for easier inspection. This is illustrated in some of the following examples.

```
#SITE      wtc.wdn     (This [wtc_wdn] will appear in the FT site select menu)
#ROUTE     wtc_wdn     (The route file must be called WTC_WDN.RT)
#STORE     wtc_wdn     (It will be stored in \DATA\datatype\wtc_dwn\year\month)
#GET       4 1 4       (Get 15-min data from address 4, store as instrument 4)
#GETDT     36 1 4      (Get detailed data from address 4 head 1 and store as instrument 4)
#GETDT     52 1 5      (Get detailed data from address 4 head 2 and store as instrument 5)
#end       *
```

Example 2 – Respirometer, Optical ammonia monitor, Single D.O.

This example is for :

Stream-switching respirometer at address 1
Optical ammonia at address 2
Double D.O. at address 3

This first subset of example 2 is for fetching all the data in one go:

```
#SITE       audit_tr
#STORE      audit_tr
#ROUTE      audit_tr
#GET        1 1 1          (15 min av. data from respirometer at address. 1, store as instrument 1)
#GET        2 1 2          (15 min av. data from AmmN monitor at address. 2, store as instrument 2)
#GET        3 1 3          (15 min av. data from D.O. at address. 3, store as instrument 3)
#GETDT      33 1 1         (Details from respirometer at address 1, store as instrument 1)
#GETDT      34 1 2         (Details from optical AmmN at address 2, store as instrument 2)
#GETDT      35 1 3         (Details from D.O. at address 3, 1st head, store as instrument 3)
#GETDT      51 1 4         (Details from D.O. at address 3, 2nd head, store as instrument 4)
#end    *
```

This second subset of example 2 is for fetching the different types of data individually as we chose:

```
#SITE       audit_tr_resp
#STORE      audit_tr
#ROUTE      audit_tr
#GET        1 1 1          (15 min av. data from respirometer at address. 1, store as instrument 1)
#GETDT      33 1 1         (Details from respirometer at address 1, store as instrument 1)
#end        *

#SITE       audit_tr_amo
#STORE      audit_tr
#ROUTE      audit_tr
#GET        2 1 2          (15 min av. data from AmmN at address. 2, store as instrument 2)
#GETDT      34 1 2         (Details from AmmN at address 2, store as instrument 2)
#end        *

#SITE       audit_tr_do
#STORE      audit_tr
#ROUTE      audit_tr
#GET        3 1 3          (15 min av. data from D.O. at address. 3, store as instrument 3)
#GETDT      35 1 3         (Details from D.O at address 3, store 1st head as instrument 3)
#GETDT      51 1 4         (Details from D.O at address 3, store 2nd head as instrument 4)
#end        *
```

Note in this example #SITE has more than 8 characters, because this is only used as a prompt in the FT site selection menu, but #STORE and #ROUTE do not, because they have to conform to DOS file and directory naming convention of 8.3 characters.

Example 3 – Phosphate monitor, Nitrate/Nitrite monitor

This example is for:

A stream-switching PO4 monitor at address 6
A stream-switching NOX monitor at address 7

It illustrates how the #SITE, #STORE and #ROUTE entries do not have to be the same.

```
#SITE       UOG_PO4     (UOG_PO4 will appear in the site selection menu in 'FT')
#ROUTE      UOG_ATHN    (It will use a route file named \MSL\ROUTES\UOG_ATHN.RT)
#STORE      Athens      (GFX Data will go to \DATA\type\Athens\year\month\…)
#GET        6           (15 min av. data from PO4 monitor at address. 6, store as instrument 6)
#GETDT      38 1 6      (Details from PO4 at address 6, store as instrument 6)
#end    *

#SITE       UOG_NOX     (UOG_NOX will appear in the site selection menu in 'FT')
#ROUTE      UOG_ATHN    (It will use a route file named \MSL\ROUTES\UOG_ATHN.RT)
#STORE      Athens      (GFX Data will go to \DATA\type\Athens\year\month\…)
#GET        7           (15 min av. data from NOX monitor at address. 7, store as instrument 7)
#GETDT      39 1 7      (Details from NOX at address 7, store as instrument 7)
#end    *
```

Example 4 – D.O. , Phosphate monitor, Nitrate/Nitrite monitor

This example is for:

A single D.O. at address 3
A Stream-switching PO4 monitor at address 6
A Stream-switching NOX monitor at address 7

```
#SITE       athns367      (athns367 will appear in the site selection menu in 'FT')
#ROUTE      UOG_ATHN      (It will use a route file named \MSL\ROUTES\UOG_ATHN.RT)
#STORE      uog_athn      (GFX Data will go to \DATA\type\uog_athn\year\month\…)
#GET        3             (15 min av. data from D.O. at address 3, store as instrument 3)
#GETDT      35 1 3        (Details from D.O at address 3, store as instrument 3)
#GET        6             (15 min av. data from PO4 monitor at address. 6, store as instrument 6)
#GETDT      38 1 6        (Details from PO4 at address 6, store as instrument 6)
#GET        7             (15 min av. data from NOX monitor at address. 7, store as instrument 7)
#GETDT      39 1 7        (Details from NOX at address 7, store as instrument 7)
#end    *
```

Example 5 – D.O. + MLSS , Ammonia, Stream Switching tank respirometer

This example is for:

A Double D.O. + MLSS at address 1
An optical ammonia at address 2
A Stream-switching respirometer at address 3

```
#SITE       dsm
#ROUTE      dsm
#STORE      dsm
#GET        1 1 1         (15 min av. data from both heads on DO at address 1, store as instrument 1)
#GET        2 1 2         (15 min av. data from AmmN at address 2, store as instrument 2)
#GET        3 1 3         (15 min av. data from respirometer at address 3, store as instrument 2)
#GETDT      33 1 1        (DO at address 1, head 1 details store as instrument 1)
#GETDT      49 1 4        (DO at address 1, head 2 details store as instrument 4)
#GETDT      34 1 2        (AmmN at address 2, store as instrument 2)
#GETDT      35 1 3        (Respirometer at address 3,store as instrument 3)
#end        *
```

Appendix A

EXAMPLES OF FT.DET FILE ENTRIES FOR MULTI-DROP & SLAVE INSTRUMENTS

EXAMPLE 1 – a double-headed DO instrument

This example is for a double D.O. + SS SLAVE at multidrop address 4

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#STORE     wtc_wdn     (It will be stored in \DATA\datatype\wtc_dwn\year\month)
#GET       4 1 4       (Get 15-min data from address 4, store as instrument 4)
#GETDT     36 1 4      (Get detailed data from address 4 head 1 and store as instrument 4)
#GETDT     52 1 5      (Get detailed data from address 4 head 2 and store as instrument 5)
#end       *
```

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